

## REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1 and 3-42 are presently active in this case, Claims 1, 3-5, 18, 20, 21, 23, 24, 32, 38, 40, and 41 having been amended and Claim 2 having been canceled by way of the present Amendment.

Claims 1-5, 7, 9, 11-16, 19, 23-37 and 39 were provisionally rejected under 35 U.S.C. 101 as claiming the same subject matter as that of Claims 1-6 of copending Application Ser. No. 09/867,549. The Applicants respectfully submit that Claims 1-5, 7, 9, 11-16, 19, 23-37 and 39 of the present application do not claim the identical subject matter as that recited in Claims 1-6 of the copending application. For example, the Applicants note that Claims 1-6 of the copending application recites a laser diode module comprising, among other features, a holder being mounted to a fastening member at a first joint position, and the fastening member being mounted to a holder mounting member at a second joint position, wherein the first joint position and the second joint position are located at substantially a same distance from a bottom plate. The Applicants note that these features are not recited in the claims of the present application, and therefore request the withdrawal of the double patenting rejection under 35 U.S.C. 101.

Claims 24-28 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Official Action indicates that the meaning of the phrase "base side plate member" is unclear. The Applicants traverse this rejection by noting that this phrase clearly recites a plate member, which is identified as being on the base side of the thermo module. Claim 27 further defines a bottom plate side plate member, which is a

plate member that is on the bottom plate side of the thermo module. By way of illustration and not limitation, the specification describes a base side plate member (17) depicted in Figure 1 as being adjacent to base (2), and a bottom plate side plate member (18) as being adjacent to bottom plate (26). The Applicants submit that Claims 24 and 27 are clear, and therefore the Applicants respectfully request the withdrawal of the indefiniteness rejections.

Claims 1-3, 6-14, 19, 22, 23, 26-29, 31, 33, 34, 39, and 42 were rejected under 35 U.S.C. 102(b) as being anticipated by Yoshino (U.S. Patent No. 5,924,290). Claims 4, 5, 15, 18, 20, 21, 24, 25, 30, 32, 38, 40, and 41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshino. Claims 16, 17, and 35-37 were rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshino in view of Miki et al. (U.S. Patent No. 6,094,515). For the reasons discussed below, the Applicants request the withdrawal of the art rejections.

Claim 1 of the present application recites a laser diode module comprising, among other features, a temperature control device thermally connected to a laser diode by a laser diode mounting member, where the temperature control device is attached to a bottom plate. The laser diode module includes an optical system mounting member that is not in contact with the temperature control device. Claim 23 of the present application advantageously recites a semiconductor laser diode module comprising, among other features, a temperature control device thermally connected to a laser diode by a laser diode mounting member, where the temperature control device is attached to a bottom plate. The semiconductor laser diode module includes a fastening means mounting member that is not in contact with the temperature control device. The fastening means is for supporting at least a portion of an optical system.

The present invention advantageously provides a configuration in which the laser diode can disperse heat through the laser diode mounting member to a temperature control

device, while the optical system is not subject to warping effects of the temperature control device. The advantages of such a configuration are explained throughout the specification, for example, in paragraphs 52-53. Support for the amendments can also be found at this portion of the specification, as well as in the figures.

The Applicants submit that the Yoshino reference does not disclose a laser diode module as expressly recited in Claims 1 and 23 of the present application. The Yoshino reference describes an optoelectronic element module having a Peltier unit (6) with a carrier (3) mounted thereon. A laser diode (1) is mounted on the carrier (3) through a heat sink (2). A lens holder assembly is provided that includes a lens holder (11) that is mounted on the Peltier unit (6). (See column 6, lines 6-8.)

The Applicants submit that Claims 1 and 23 are distinguishable over the Yoshino reference since the Yoshino reference describes a module in which the lens holder assembly is directly mounted to, and therefore is in contact with, the Peltier unit (6). To the contrary, Claim 1 of the present application recites a laser diode module comprising an optical system mounting member that is not in contact with the temperature control device. Additionally, Claim 23 of the present application advantageously recites a semiconductor laser diode module a fastening means mounting member that is not in contact with the temperature control device, and the fastening means is for supporting at least a portion of an optical system. Such configurations are not disclosed or suggested by the Yoshino reference. *see fig 2*  
Accordingly, the Applicants request the withdrawal of the art rejection of Claims 1 and 23.

Claims 3, 6-17, 19, 22, 23, 31, 33-37, 39, and 42 are considered allowable for the reasons advanced for Claims 1 and 23 from which they depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed,

taught, nor suggested by the applied references when those features are considered within the context of Claims 1 and 23.

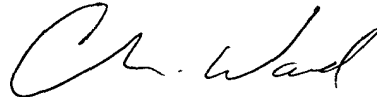
Claims 4, 5, 18, 20, 21, 24, 32, 38, 40, and 41 have been rewritten in independent form, and the Applicants respectfully traverse the rejections of these claims, as well as Claims 25-30, which depend from Claim 24. For each of these claims, the Official Action admits that the limitations recited therein are not disclosed by the Yoshino reference. However, the Official Action indicates that these limitations recited were obvious design choices. The Applicants respectfully traverse such an assertion. The specification describes the advantages obtained by the present invention, which are not even suggested by the Yoshino reference. (See, e.g., paragraphs 108-120.) For example, the recitation of linear expansion coefficients provide advantageous suppression of warpage between various components of the present invention, and such a configuration is not suggested in the Yoshino reference. In fact, the Yoshino reference recognizes the problem, and provides a solution that teaches away from the solution used in the present application, by teaching that the Peltier unit should be mounted to allow a positional shift thereof along the mounting surface of the package. (See the Abstract.)

The Applicants submit that a *prima facie* case of obviousness as set forth in MPEP 2143 has not been established for Claims 4, 5, 18, 20, 21, 24-30, 32, 38, 40, and 41, since no reference is cited for the teaching of the express limitations recited therein. The Applicants respectfully submit that the inventions recited in Claims 4, 5, 18, 20, 21, 24-30, 32, 38, 40, and 41 are not mere matters of design choice, and provide the advantages described throughout the specification, and therefore the Applicants request withdrawal of the obviousness rejections thereof or the citation to a reference(s) that teach such features.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Bradley D. Lytle  
Attorney of Record  
Registration No. 40,073

Christopher D. Ward  
Registration No. 41,367



**22850**

Tel. (703) 413-3000  
Fax. (703) 413-2220  
(OSMMN 10/00)

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I:\atty\cdw\205471US8\am1.wpd

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IN THE CLAIMS

1. (Once Amended) A laser diode module comprising:
  - a laser diode;
  - an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;
  - an optical system mounting member configured to support at least a portion of said optical system;
  - a laser diode mounting member configured to support said laser diode, said optical system mounting member being attached to said laser diode mounting member; [and]
  - a bottom plate configured to support said laser diode, said optical system, said optical system mounting member, and said laser diode mounting member; and
  - a temperature control device thermally connected to said laser diode by said laser diode mounting member, said temperature control device being attached to said bottom plate,
  - wherein said optical system mounting member is not in contact with said temperature control device.

2. (Cancel)

3. (Once Amended) The laser diode module according to Claim [2] 1, wherein said temperature control device is a thermo module, said thermo module having a first plate

member attached to said laser diode mounting member, a second plate member attached to said bottom plate, and a peltier element positioned between said first plate member and said second plate member.

4. (Once Amended) [The] A laser diode module [according to Claim 3] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

an optical system mounting member configured to support at least a portion of said optical system;

a laser diode mounting member configured to support said laser diode, said optical system mounting member being attached to said laser diode mounting member;

a bottom plate configured to support said laser diode, said optical system, said optical system mounting member, and said laser diode mounting member; and

a temperature control device thermally connected to said laser diode by said laser diode mounting member, said temperature control device being attached to said bottom plate,

wherein said temperature control device is a thermo module, said thermo module having a first plate member attached to said laser diode mounting member, a second plate member attached to said bottom plate, and a peltier element positioned between said first plate member and said second plate member, and

wherein said laser diode mounting member is formed of material having a linear expansion coefficient in a range between a linear expansion coefficient of said optical system mounting member and a linear expansion coefficient of said first plate member of said thermo module.

5. (Once Amended) [The] A laser diode module [according to Claim 3] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

an optical system mounting member configured to support at least a portion of said optical system;

a laser diode mounting member configured to support said laser diode, said optical system mounting member being attached to said laser diode mounting member;

a bottom plate configured to support said laser diode, said optical system, said optical system mounting member, and said laser diode mounting member; and

a temperature control device thermally connected to said laser diode by said laser diode mounting member, said temperature control device being attached to said bottom plate,

wherein said temperature control device is a thermo module, said thermo module having a first plate member attached to said laser diode mounting member, a second plate member attached to said bottom plate, and a peltier element positioned between said first plate member and said second plate member, and

wherein said optical system mounting member has a thermal conductivity lower than a thermal conductivity of said laser diode mounting member and said first plate member of said thermo module.

18. (Once Amended) [The] A laser diode module [according to Claim 11] comprising:

a laser diode;



an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

an optical system mounting member configured to support at least a portion of said optical system;

a laser diode mounting member configured to support said laser diode, said optical system mounting member being attached to said laser diode mounting member; and

a bottom plate configured to support said laser diode, said optical system, said optical system mounting member, and said laser diode mounting member,

wherein said lens portion is a discrete lens supported by said optical system mounting member, and

wherein said laser diode mounting member is directly fixed on said bottom plate.

20. (Once Amended) [The] A laser diode module [according to Claim 1] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

an optical system mounting member configured to support at least a portion of said optical system;

a laser diode mounting member configured to support said laser diode, said optical system mounting member being attached to said laser diode mounting member; and

a bottom plate configured to support said laser diode, said optical system, said optical system mounting member, and said laser diode mounting member, wherein:

said laser diode mounting member is made of a material having a thermal conductivity of at least 150 W/mK; and

said optical system mounting member is made of a material having a thermal conductivity of at most 50 W/mK.

21. (Once Amended) [The] A laser diode module [according to Claim 1] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

an optical system mounting member configured to support at least a portion of said optical system;

a laser diode mounting member configured to support said laser diode, said optical system mounting member being attached to said laser diode mounting member; and

a bottom plate configured to support said laser diode, said optical system, said optical system mounting member, and said laser diode mounting member,

wherein said optical system mounting member is made of a material having a Young's modulus of at least  $15 \times 10^3$  kg/mm<sup>2</sup>.

23. (Once Amended) A semiconductor laser diode module comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

a fastening means for supporting at least a portion of said optical system;

a base configured to support said fastening means and said laser diode; [and]

a bottom plate configured to support said laser diode, said optical system, said fastening means, and said base, wherein said base includes a laser diode mounting member and a fastening means mounting member, said laser diode mounting member having a laser diode mounting region configured to mount said laser diode, said fastening means mounting member being mounted to said laser diode mounting member at a position other than said laser diode mounting region; and

a temperature control device thermally connected to said laser diode by said laser diode mounting member, said temperature control device being attached to said bottom plate, wherein said fastening means mounting member is not in contact with said temperature control device.

24. (Once Amended) [The] A semiconductor laser diode module [according to Claim 23,] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

a fastening means for supporting at least a portion of said optical system;

a base configured to support said fastening means and said laser diode; and

a bottom plate configured to support said laser diode, said optical system, said fastening means, and said base,

wherein said base includes a laser diode mounting member and a fastening means mounting member, said laser diode mounting member having a laser diode mounting region configured to mount said laser diode, said fastening means mounting member being mounted

to said laser diode mounting member at a position other than said laser diode mounting region, and further comprising:

a thermo module mounted on said bottom plate, said thermo module having a base side plate member on which said base is mounted, wherein said laser diode mounting member is formed of a material having a linear expansion coefficient in a range between a linear expansion coefficient of said fastening means mounting member and a linear expansion coefficient of said base side plate member of said thermo module.

32. (Once Amended) [The] A semiconductor laser diode module [according to Claim 31,] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

a fastening means for supporting at least a portion of said optical system;

a base configured to support said fastening means and said laser diode; and

a bottom plate configured to support said laser diode, said optical system, said fastening means, and said base,

wherein said base includes a laser diode mounting member and a fastening means mounting member, said laser diode mounting member having a laser diode mounting region configured to mount said laser diode, said fastening means mounting member being mounted to said laser diode mounting member at a position other than said laser diode mounting region, wherein said lens portion has a fiber lens formed on said optical fiber, wherein said fiber lens has a tip end side arranged to oppose a light emitting facet of said laser diode, and wherein said fiber lens is an anamorphic lens.

38. (Once Amended) [The] A semiconductor laser diode module [according to Claim 23,] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

a fastening means for supporting at least a portion of said optical system;

a base configured to support said fastening means and said laser diode; and

a bottom plate configured to support said laser diode, said optical system, said fastening means, and said base,

wherein said base includes a laser diode mounting member and a fastening means mounting member, said laser diode mounting member having a laser diode mounting region configured to mount said laser diode, said fastening means mounting member being mounted to said laser diode mounting member at a position other than said laser diode mounting region, and wherein said laser diode mounting member is directly fixed on said bottom plate.

40. (Once Amended) [The] A semiconductor laser diode module [according to Claim 23,] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

a fastening means for supporting at least a portion of said optical system;

a base configured to support said fastening means and said laser diode; and

a bottom plate configured to support said laser diode, said optical system, said fastening means, and said base,

wherein said base includes a laser diode mounting member and a fastening means mounting member, said laser diode mounting member having a laser diode mounting region configured to mount said laser diode, said fastening means mounting member being mounted to said laser diode mounting member at a position other than said laser diode mounting region, and wherein:

said laser diode mounting member is made of a material having a thermal conductivity of at least 150 W/mK; and

said fastening means mounting member is made of a material having a thermal conductivity of at most 50 W/mK.

41. (Once Amended) [The] A semiconductor laser diode module [according to Claim 23,] comprising:

a laser diode;

an optical system including an optical fiber and a lens portion, said optical system being configured to receive and transmit a beam emitted from said laser diode through said lens portion to said optical fiber along an optical axis;

a fastening means for supporting at least a portion of said optical system;

a base configured to support said fastening means and said laser diode; and

a bottom plate configured to support said laser diode, said optical system, said fastening means, and said base,

wherein said base includes a laser diode mounting member and a fastening means mounting member, said laser diode mounting member having a laser diode mounting region configured to mount said laser diode, said fastening means mounting member being mounted

to said laser diode mounting member at a position other than said laser diode mounting region, and wherein said fastening means mounting member is made of a material having a Young's modulus of at least  $15 \times 10^3 \text{ kg/mm}^2$ .